heat transfer engineering

AN INTERNATIONAL JOURNAL

Volume 26 Number 1 2005

editorial

Fouling of Heat Exchangers–New Approaches to Solve an Old Problem 1
H. Müller-Steinhagen, M. R. Malayeri, and A. P. Watkinson

technology development

Recent Issued United States Patents 5
Zahid H. Ayub

feature articles

Fouling of Some Canadian Crude Oils 7
M. Srinivasan and A. P. Watkinson

Fouling Characteristics of a Light Australian Crude Oil 15
Zaid S. Saleh, R. Sheikholeslami, and A. P. Watkinson

Retrofitting Crude Oil Refinery Heat Exchanger Networks to Minimize Fouling While Maximizing Heat Recovery 23
B. L. Yeap, D. I. Wilson, G. T. Polley, and S. J. Pugh

Fouling During the Use of Seawater as Coolant—the Development of a User Guide 35
S. J. Pugh, G. F. Hewitt, and H. Müller-Steinhagen

Biocide Dosing Strategies for Biofilm Control 44
D. M. Grant and T. R. Bott

Challenges in Cleaning: Recent Developments and Future Prospects 51
D. I. Wilson

departments

Book Review Corner 60
People and Personalities 63
New Products and Services 64
Product Literature 69
Hot Dates 71
Current Contents 76

Volume 26 Number 2 2005

editorial

New Heat Transfer Reference Book Available Free on Web 1
John R. Thome

feature articles

Influence of Surface Properties and Characteristics on Fouling in Plate Heat Exchangers 3
H. U. Zettler, M. Weiß, Q. Zhao, and H. Müller-Steinhagen

Experimental Study of Heat Transfer and Pressure Drop Characteristics of Air/Water and Air-Steam/Water Heat Exchange in a Polymer Compact Heat Exchanger 18
Lixin Cheng and Cees W. M. van der Geld

Experimental Study on the Heat and Mass Transfer of Teflon-Coated Tubes for the Latent Heat Recovery 28
Jangho Lee, Tae-Joo Kim, and Moo Hwan Kim

Convective Heat Transfer Coefficients in Concentric Annuli 38
J. Dirker and J. P. Meyer

Analytical Solution of Viscoelastic Fluid Flow and Heat Transfer through an Annulus 45
S. H. Hashemabadi, S. Gh. Etemad, and J. Thibault

The Effect of Plate Size on the Natural Convective Heat Transfer Intensity of Horizontal Surfaces 50
Ewa Radziemska and Witold M. Lewandowski

A Study of the Effect of Duct Width on Fully Developed Turbulent Flow Characteristics in a Corrugated Duct 54
S. Ergin and M. Ota

A Spreadsheet-Based Analysis for Two-Dimensional Transient Laser Heating of a Cylindrical Solid 63
Thomas A. Mullen and Michelle L. Pantoya

Examination of the Thermal Equilibrium Assumption in the Microscopic Parabolic Heat Conduction Model Under the Effect of Two Types of Heating Sources 75
M. A. Al-Nimr, M. A. Hader, and Vladimir A. Hammoudeh

An Experimental and Computational Study of Heat Transfer in High Power Amplifiers 81
Luke Maguire, Masud Behnia, and Graham Morrison

Augmentation of Thermal Effectiveness in the Fixation of Fibrous Material Structures 93
Alfonsas Skrinska and Nijolė Vegytė

departments

People and Personalities 99
New Products and Services 101
Hot Dates 103
Current Contents 108

Volume 26 Number 3 2005

editorial

Selected Papers from the Second International Conference on Microchannels and Minichannels 1
Satish G. Kandlikar

feature articles

Minichannels in Polymer Electrolyte Membrane Fuel Cells 3
T. A. Trabold

Effects of Channel Diameter and Liquid Properties on Void Fraction in Adiabatic Two-Phase Flow Through Microchannels 13
A. Kawahara, M. Sadatomi, K. Okayama, M. Kawaji, and P. M.-Y. Chung

Experimental Study of Flow Patterns, Pressure Drop, and Flow Instabilities in Parallel Rectangular Minichannels 20
Prabhu Balasubramanian and Satish G. Kandlikar

Condensation Pressure Drop in Circular Microchannels 28
Srinivas Garimella, Akhil Agarwal, and Jesse D. Killion

An Experimental Study of Flow Condensation Heat Transfer Inside Circular and Rectangular Mini-Channels 36
Jeong Seob Shin and Moo Hwan Kim

Condensation Heat Transfer and Pressure Gradient Inside Multiport Minichannels 45
Alberto Cavallini, Davide Del Col, Luca Doretti, Marko Matkovic, Luisa Rossetto, and Claudio Zilio

Extruded Microchannel-Structured Heat Exchangers 56
Jean-Antoine Gruss, Christophe Bouzon, and Bernard Thonon

Catalytic Microchannels Stacked by Brazing Method 64
Sang-Phil Yu, Seung-Jae Lee, Nam-Jo Jeoung, In-Soo Ryu, Sung-Kyu Kang, and Kwang-Sup Song

Fluid Dynamics and Transfer Processes in Bended Microchannels 71
Norbert Kockmann, Michael Engler, Daniel Haller, and Peter Woias

Direct Comparison between Five Different Microchannels, Part 1: Channel Manufacture and Measurement 79
Cormac Eason, Tara Dalton, Mark Davies, Cian O'Mathúna, and Orla Slattery

Direct Comparison between Five Different Microchannels, Part 2: Experimental Description and Flow Friction Measurement 89
Cormac Eason, Tara Dalton, Mark Davies, Cian O'Mathúna, and Orla Slattery

Volume 25 Number 4 2005

editorial

Building Bridges and Breaking Barriers... 1
Vishwas V. Wadekar

feature articles

Two-Phase Flow Distribution to Tubes of Parallel Flow Air-Cooled Heat Exchangers 3
Ralph L. Webb and Kilyoan Chung

Effects of Distributor Configuration on Flow Maldistribution in Plate-Fin Heat Exchangers 19
Anjun Jiao and SeungWook Baek

Pool Boiling Heat Transfer to Phosphoric Acid Solutions 26
R. M. Behbahani, M. Jamialahmadi, and H. Müller-Steinhagen

Refinement of the Transfer Characteristic Correlation of Wet-Cooling Tower Fills 35
J. C. Kloppers and D. G. Kröger

Free Convective Heat Transfer Structures as a Function of the Width of Isothermal Horizontal Rectangular Plates 42
Ewa Radziemska and Witold M. Lewandowski

Numerical Study on a Cooling Strategy for Boiling, Saline-Based Tumor Hyperthermic Injector 51
Lin Gui and Jing Liu

A Numerical Study of the Thermal Entrance Effect in Miniature Thermal Conductivity Detectors 65
Young-Min Kim, Woo-Seung Kim, and Won-Gee Chun

Modeling of Thermal Performance of a Cooling Tower Using an Artificial Neural Network 73
Yasar Islamoglu

Thermal Analysis of a Small, Totally Enclosed, Fan-Cooled Induction Motor 77
M. K. Yoon and S. Ken Kauh

Volume 26 Number 5 2005

editorial

Selected Papers from the PRES 2003 Conference 1
Petr Stehlik and Jiri Klemes

feature articles

Retrofit Optimization Framework for Compact Heat Exchangers 4
Igor Bulatov

Utilizing CFD as an Efficient Tool for Improved Equipment Design 15
J. Hájek, V. Kermes, P. Stehlík, and J. Šikula

Integrated Synthesis of Optimal Separation and Heat Exchanger Networks Involving Separations Based on Various Properties 25
I. Heckl, F. Friedler, and L. T. Fan

An Evaluation of Heat Transfer Surface Materials Used in Fouling Applications 42
D. J. Kukulka

The Effect of Coverings on Heat Transfer from a Window to a Room 47
P. H. Oosthuizen, L. Sun, S. J. Harrison, D. Naylor, and M. Collins

A New Realistic Characteristics of Real Energy Conversion Process: A Contribution of Finite Size Thermodynamics 66
Driss Stitou and Bernard Spinner

Advanced and High-Performance Heat Exchangers for the Hydrocarbon-Processing Industries 73
B. Thonon

Errata 85

Volume 26 Number 6 2005

editorial

Thermal Management of Computer Hard Drives 1
Majid Molki

technology development

Recent Developments in CO_2 Heat Transfer 3
Zahid H. Ayub

feature articles

The Fin-on-Plate Heat Exchanger: A New Configuration for Air-Cooled Power Plants 7
Vahab Hassani, James Dickens, and Kennett J. Bell

Heat Transfer during Annular Tube Contact in a Helically Coiled Tube-in-Tube Heat Exchanger 16
Willem I. Louw and Josua P. Meyer

Three-Dimensional Modeling of a Helixchanger® Heat Exchanger Using CFD 22
Malcolm J. Andrews and Bashir I. Master

Experimental Investigations of Flow Resistance and Convection Heat Transfer and Prediction of Cold Heat-Storage Characteristics for a Phase-Change Emulsion in a Coiled Circular Tube 32
Zhennan Zhao and Yuquan Shi

A Review of Concentric Annular Heat Pipes 45
A. Nouri-Borujerdi and M. Layeghi

A Comprehensive, One-Dimensional Model of Fiber Processing 59
Kelly W. Chandler, John Peddieson, Stephen A. Idem, and Steve G. Rochelle

Theoretical Relation between the Number of Diffusion Units and Pressure Drop in Direct Contact Heat Transfer 68
Jose A. Sirena

Effects of Viscous Dissipation and Joule Heating on Magnetohydrodynamic Hiemenz Flow of a Micropolar Fluid 75
M. F. El-Amin and A. A. Mohammadein

departments

People and Personalities 82 | New Products and Services 83 | Current Contents 86

Volume 26 Number 7 2005

editorial

Selected Papers from the Second HEFAT Conference 1
Josua P. Meyer and Petr Stehlík

feature articles

Reflux Condensation under Vacuum of a Methanol/Water Mixture with Plain Tube and Tube Inserts 3
T. H. Ooi, H. R. S. Benson, and P. J. Heggs

Influence of Spiral Angle on Heat Transfer during Condensation inside Spiralled Micro-Fin Tubes 11
Jean-Pierre Bukasa, Leon Liebenberg, and Josua P. Meyer

Finned-Tube Heat Exchanger Optimization Methodology 22
Susan W. Stewart, Sam V. Shelton, and Kristinn A. Aspelund

Experimental Determination of the Heat Transfer Coefficient of a Plate-Fin Heat Exchanger 29
Michel De Paepe, An Willems, and Alexis Zenner

Steady-State and Transient Behavior of Two Heat Exchangers Coupled by a Circulating Flowstream 36
Chakkrit Na Ranong, Jobst Hapke, and Wilfried Roetzel

Effects of Geometry, Flow Index, and Temperature on Flow Splitting 51
Nishani Kandaiah, Omar K. Matar, Chris J. Lawrence, Sabina Burmester, and Ian Burns

Combined Approach Supporting Integrated Furnace Design and Retrofit 58
Zdeněk Jegla, Petr Stehlík, and Josef Kohoutek

Volume 26 Number 8 2005

editorial

Scaling-Down of Miniature Internal Combustion Engines: Limitations and Challenges 1
Eran Sher and Diana Levinzon

feature articles

High Flux Heat Removal with Microchannels—A Roadmap of Challenges and Opportunities 5
Satish G. Kandlikar

An Experimental Study and Numerical Modeling of the Flow in a Network of Triangular Microchannels 15
Mariusz Niklas and Michel Favre-Marinet

Heat Transfer Characteristics during Mist Cooling on a Heated Cylinder 24
Sookwan Lee, Jeeman Park, Piljong Lee, and Moohwan Kim

Thermal Insulation for a Pipe Using Phase Change Material 32
Esam M. Alawadhi

Temperature Distribution in Different Materials Due to Short Pulse Laser Irradiation 41
Arindam Banerjee, Anil A. Ogale, Champak Das, Kunal Mitra, and Chelakara Subramanian

The Effect of Windbreak Walls on the Thermal Performance of Natural Draft Dry Cooling Towers 50
Rafat Al-Waked and Masud Behnia

On the Mass and Energy Balances of Two-Phase Systems 63
Jovan Mitrovic

Numerical Simulation-Aided Parametric Analysis of Natural Convection in a Roof of Triangular Enclosures 69
S. C. Tzeng, J. H. Liou, and R. Y. Jou

Entropy Analysis Due to Temperature and Stress Fields in the Solid Irradiated by a Time Exponentially Varying Laser Pulse 80
Bekir S. Yilbas

Volume 26 Number 9 2005

editorial

The Role of Heat Transfer in Refrigeration 1
J. A. R. Parise and R. Pitanga Marques

feature articles

Flow Passage Arrangement and Surface Selection in Multistream Plate-Fin Heat Exchangers 5
M. Picón-Núñez and J. L. López Robles

Interpreting and Applying Experimental Data for Plate-Fin Surfaces: Problems with Power Law Correlation 15
Graham T. Polley and Mazen M. Abu-Khader

Heat Transfer Characteristics of a Quadratic Koch Island Fractal Heat Exchanger 22
Josua P. Meyer and Hilde van der Vyver

Some New Solutions for Extended Surface Heat Transfer Using Symbolic Algebra 30
Abdul Aziz and Greg McFadden

Dynamic Thermoelastic Response of a Heated Thin Composite Plate Using the Dual-Phase-Lag Heat Conduction Model 41
Naser S. Al-Huniti and M. A. Al-Nimr

Sensitivity Analysis of Classical Heat Conduction Solutions Applied to Materials Characterization 50
Sergio Marinetti and Vladimir Vavilov

A Numerical Analysis of the Local Anomalies in a Natural-Draft Cooling Tower 61
Maja Rotar, Brane Širok, Boštjan Drobnič, Matej Novak, and Bozin Donevski

Study on the Heat and Fluid Transport inside the Biological Tissues Subject to Boiling Saline-Based Tumor Hyperthermic Injection 73
Lin Gui and Jing Liu

Volume 26 Number 10 2005

editorial

Tons of Two-Phase Data and Correlations: What's Next? 1
Chi-Chung Wang

feature articles

Compensating for End Effects in Plate-and-Frame Heat Exchangers 3
Graham T. Polley and Mazen M. Abu-Khader

Optimal Ground Tube Length for Cooling of Electronics Shelters 8
J. V. C. Vargas, J. C. Ordonez, C. Zamfirescu, M. C. Campos, and A. Bejan

Numerical Investigation of Convective Heat Transfer in Unsteady Laminar Flow Over a Square Cylinder in a Channel 21
Mohammad Rahnama and Hakimeh Hadi-Moghaddam

Convective Heat Transfer in the Reusable Solid Rocket Motor of the Space Transportation System 30
Rashid A. Ahmad

Free Convective Heat Transfer in Tilted Longitudinal Open Cavity 46
S. W. Chang, S. F. Chiou, L. M. Su, and T. L. Yang

Neural Computation to Estimate Heat Flux in an Atmospheric Plasma Spray Process 65
Sofiane Guessasma, Deng Hao, Larbi Moulla, Hanlin Liao, and Christian Coddet

Microscopic vs. Macroscopic Hyperbolic Heat Conduction: Validation Criterion under the Effect of a Moving Heating Source 73
A. F. Khadrawi and M. A. Al-Nimr

Entropy Generation Due to the Flow of a Non-Newtonian Fluid with Variable Viscosity in a Circular Pipe 80
B. S. Yilbas and M. Pakdemirli